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FEDERAL-STATE COOPERATIVE

SNOW SURVEYS AND IRRIGATION WATER FORECASTS

FOR

MONTANA

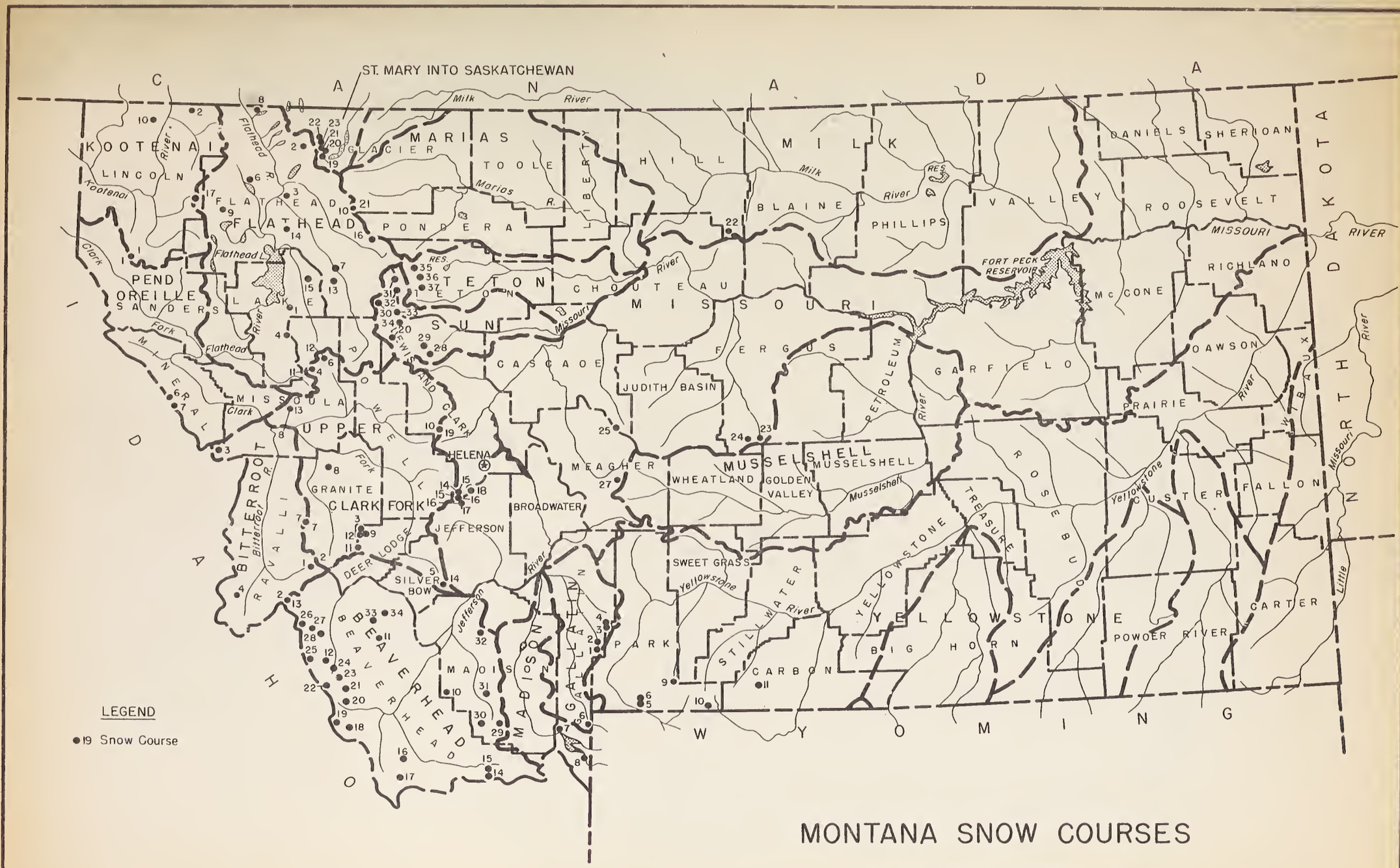
February 1, 1949

LIBRARY
CURRENT SERIAL RECORD
SEP 14 1949
U. S. DEPARTMENT OF AGRICULTURE

Division of Irrigation
Soil Conservation Service
Montana State Agricultural Experiment Station
Bozeman, Montana

and

State Engineer of Montana



UNITED STATES DEPARTMENT OF AGRICULTURE
REGION 7
SOIL CONSERVATION SERVICE
MONTANA, 7-L-10723

INDEX TO MONTANA SNOW COURSES

Name	Montana No.	Elev.	Location Sec. Lat.	Twp.	Range Long.	Record Began	Measuring Dates[a]	Measured By[b]
MISSOURI RIVER DRAINAGE								
JEFFERSON RIVER								
White Pine Ridge	16	8850	18	14S	9W	1948	3,4	1
Limekiln	17	6950	5	15S	9W	1948	3,4	1
Lakeview Ridge	14	7400	27	14S	2W	1948	3,4,5	9
Lakeview Canyon	15	6930	26	14S	2W	1948	3,4,5	9
Trail Creek	18	7050	15	10S	15W	1948	3,4	1
Lemhi Pass	19	7480	9	10S	15W	1948	3,4	1
Terrell Creek	20	6650	14	9S	15W	1948	3,4	1
Selway Junction	21	6800	27	8S	15W	1948	3,4	1
Gold Stone	22	8100	11	8S	16W	1948	3,4	1
Bloody Dick	23	7600	12	8S	16W	1948	3,4	1
Jahnke Creek	24	7340	25	7S	16W	1948	3,4	1
Miner Forks	25	7300	24	6S	17W	1948	3,4	1
Miner Lake	12	6720	10	6S	16W	1945	3,4,5	1
Big Hole Pass	26	7440	28	3S	15W	1948	3,4	1
Below Big Hole Pass	27	6900	24	3S	16W	1948	3,4	1
East Boundary	28	6700	22	3S	17W	1948	3,4	1
Gibbons Pass	13	7100	4	2S	19W	1934	2,3,4,5	1,2
Elk Horn	11	8450	15	4S	12W	1934	3,4,5	2
Anderson Meadow	33	7000	18	3S	12W	1948	3,4	1
Wise River	34	6300	15	2S	12W	1948	3,4	1
Upper Cottonwood	29	8400	30	10S	2W	1948	3,4	1
Cottonwood	30	5900	25	10S	3W	1948	3,4	1
Vigilante	31	6125	28	9S	3W	1948	3,4	1
Flashlight	10	6950	22	8S	7W	1945	3,4,5	1
Tobacco Root	32	6900	18	4S	3W	1948	3,4	1
MADISON RIVER								
Hebgen	7	6550	22	11S	3E	1934	1,2,3,4,5	2
West Yellowstone	8	6700	34&35	13S	5E	1934	1,2,3,4,5	2
GALLATIN RIVER								
Devil's Slide	1	8100	14	5S	6E	1935	3,4,5	2,6
Hood Meadow Extension	2	6600	22	4S	6E	1934	3,4,5	2,6
Mystic Lake #1 & #2	3	6600	30	3S	7E	1935	1,2,3,4	6,7
New World Trail	4	6700	24	3S	6E	1939	3,4	6,7
21 Mile	6	7150	1	11S	5E	1934	2,3,4,5	2
YELLOWSTONE RIVER								
Crevice #1	5	8400	29	9S	9E	1935	3,4	1
Crevice #2	6	8150	26	9S	9E	1935	3,4	1
Independence	9	8000	22	7S	12E	1940	3,4	6
Cooke City	10	7400	25	9S	14E	1937	1,2,3,4,5	5
Camp Senia	11	7690	2	8S	18E	1938	3,4	1
MUSSELSHELL RIVER								
Grasshopper	27	7000	19	9N	8E	1938	3,4	1,6
MISSOURI RIVER MAIN STEM								
Pipestone Pass	14	7200	11	1N	7W	1938	2,3,4,5	1
Tenmile Creek, Lower	15	6250	13	8N	6W	1935	1,2,3,4,5	2
Tenmile Creek, Middle	16	6800	13	8N	6W	1934	1,2,3,4,5	2
Tenmile Creek, Upper	17	8000	19	8N	6W	1935	1,2,3,4,5	2
Chessman Reservoir	18	6200	2	8N	5W	1936	1,2,3,4,5	2
Stemple Pass	19	6900	16	13N	7W	1934	3,4,5	2
Crystal Lake	24	6100	24	12N	17E	1941	3,4	1,6
Kings Hill	25	7950	35	13N	7E	1937	3,4,5	2
Grasshopper	27	7000	19	9N	8E	1938	3,4	1,6
SUN RIVER								
My Lake	30	7300	21	23N	12W	1949	3,4	1
Wrong Creek Ridge	31	6800	17	25N	10W	1949	3,4	1
Wrong Creek	32	5700	32	25N	10W	1949	3,4	1
Gates Park	33	5300	31	24N	10W	1949	3,4	1
Cabin Creek	34	5400	33	23N	10W	1949	3,4	1
5 Bull	28	5600	36	20N	10W	1948	3,4	1
Bench Mark	29	5500	9	20N	10W	1948	3,4	1
Goat Mountain	20	7000	21	22N	10W	1934	3,4	2
TETON RIVER								
Fright Creek	35	6000	13	26N	10W	1948	3,4	1
West Fork	36	6000	6	25N	9W	1948	3,4	1
Baldron	37	5600	16	25N	9W	1948	3,4	1
MARIAS RIVER								
Marias Pass	21	5250	48°19'		113°21'	1934	1,2,3,4,5	2
MILK RIVER								
Rocky Boy	22	5200	15	28N	18E	1942	3,4	6

Name	Montana No.	Elev.	Location Sec. Lat.	Twp.	Range Long.	Record Began	Measuring Dates[a]	Measured By[b]
COLUMBIA DRAINAGE								
KOOTENAI RIVER								
Baree Mountain	1	6000	1	25N	31W	1937	4,5	1
Bluebird Basin	2	6800	24	37N	26W	1937	4,5	1
Red Mountain	10	6000	4	36N	29W	1937	3,4,5	1
UPPER CLARK FORK								
Chessman Reservoir	1	6200	2	8N	5W	1936	1,2,3,4,5	2
East Fork Ranger Station	2	5400	16	2N	17W	1937	4	1
Intergaard	3	6450	6	5N	13W	1935	2,3,4	3
North Fork Jocko	4	6330	3	17N	17W	1941	3,4	4
Pipestone Pass	5	7200	11	1N	7W	1938	2,3,4,5	1
Rainy Lake	6	4300	11	16N	16W	1947	3,4,5	1
Skalkaho Summit	7	7258	30	6N	17W	1937	4,5	1
Slide Rock Mountain	8	7100	26	10N	16W	1937	4	1
Southern Cross	9	6500	9	5N	13W	1935	2,3,4	3
Stemple Pass	10	6900	16	13N	7W	1934	3,4,5	2
Storm Lake No. 2	11	7780	19	4N	13W	1939	4,5	1
Stuart Mill	12	6500	19	5N	13W	1935	2,3,4	3
Stuart Mountain #1	13	7400	6	14N	16W	1936	3,4,5	1
Tenmile Creek, Lower	14	6250	13	8N	6W	1935	1,2,3,4,5	2
Tenmile Creek, Middle	15	6800	13	8N	6W	1934	1,2,3,4,5	2
Tenmile Creek, Upper	16	8000	19	8N	5W	1935	1,2,3,4,5	2
BITTERROOT RIVER								
East Fork Ranger Station	1	5400	16	2N	17W	1937	4	1
Gibbons Pass	2	7100	4	2S	19W	1934	2,3,4,5	1,2
Mud Creek Pasture	3	4500	24	11N	24W	1937	2,3,4,5	1
Nezperce Camp	4	5580	19&20	1S	23W	1937	3,4	1
Skalkaho Summit	7	7258	30	6N	17W	1937	4,5	1
Stuart Mountain #1	8	7400	6	14N	16W	1936	3,4,5	1
FLATHEAD RIVER								
Big Creek	1	6750	6& 7	22N	18W	1941	4,5	4
Cattle Queen	2	4700	7	35N	17W	1939	3,4	5
Desert Mountain	3	5600	24	31N	19W	1937	4,5	1
Elk Mountain	4	6750	1	20N	19W	1941	3,4	4
Goat Mountain	5	7000	47°39'		114°54'	1934	3,4	2
Hell Roaring Creek Divide	6	5770	35	32N	22W	1942	4,5	1
Horse Ridge c	7	5200	8	25N	15W	1937	4,5	1
Kishenehn	8	4300	7	37N	21W	1946	4,5	5
Logan Creek	9	4300	34	30N	24W	1937	3,4	1
Marias Pass	10	5250	48°19'		113°21'	1934	1,2,3,4,5	2
North Fork Jocko	11	6330	3	17N	17W	1941	3,4,5	4
Rainy Lake	12	4300	11	16N	16W	1947	3,4,5	1
Spotted Bear Mountain	13	7000	23	25N	15W	1948	3,4	1
Strawberry Lake	14	6500	11	28N	19W	1948	3,4	1
Trinkus Lake	15	6500	9	25N	17W	1948	3,4	1
Snow Laboratory Station #13	16	5240	10	29N	14W	1946	1,2,3,4,5	2
Brush Creek	17	5000	13	30N	26W	1937	3,4	1
PEND OREILLE RIVER								
Baree Mountain	1	6000	1	25N	31W	1937	4,5	1
Freezeout Summit	6	7000	21	15N	27W	1937	3,4	1
Hoodoo Creek	7	6200	9&16	14N	27W	1937	3,4	1
SASKATCHEWAN RIVER DRAINAGE								
ST. MARY RIVER								
Piegan Pass #6	19	6500	48°45'		113°42'	1922	b	2,8
Piegan Pass #4	20	5000	48°46'		113°40'	1922	5	2,8
Mount Allen	21	7000	48°44'		113°40'	1922	5	2,8
Ptarmigan #8	22	5800	48°50'		113°42'	1922	5	2,8
Iceberg Lake	23	6000	48°50'		113°42'	1922	5	2,8

a. Numerals 1,2,3,4, and 5 refer to January 1, February 1, March 1, April 1, and May 1.

b. Numerals refer to Agency that secures the snow survey, as follows:

1. U. S. Forest Service
2. U. S. Geological Survey and U. S. Engineer Corps
3. Montana Power Company
4. U. S. Indian Service
5. National Park Service
6. Montana Experiment Station
7. City of Bozeman
8. Dominion Water and Power Bureau
9. U. S. Fish and Wildlife Service

c. Discontinued 1943-1947

WATER SUPPLY OUTLOOK

Missouri River Basin, February 1, 1949

The Missouri River Basin Spring Water supply for Irrigation appears to be very favorable for the 1949 spring runoff season. Snow Survey measurements indicate that an above normal supply of water is stored in the mountains. These Measurements as of February 1, 1949 show that most courses in the Upper Basin have above or close to April 1 average water content, and approximately 130% of the average for February 1 measurements. Provided the remainder of the year (February and March) maintains its normal quota of snowfall this basin should produce sufficient water for all anticipated needs.

At the present time the ice flows in the Missouri and Yellowstone River are presenting a definite flood hazard should the Upper Basin be visited by a sudden thaw or chinook.

Reservoir Storage throughout the Upper Basin is substantially the same as last year, showing an adequate seasonal carry-over.

Temperatures through the Basin have been exceptionally low, running close to 5 to 15 degrees below normal.

Precipitation for the past month has averaged close to normal.

Upper Columbia River Basin in Montana
February 1, 1949

The Irrigation Water Supply dependent upon the Upper Columbia River in Montana appears to be well above normal for the first of February. Snow Survey measurements made on the Bitterroot, Clark Fork, Blackfoot, Kootenai and Columbia River in Canada, indicate approximately 150% of average water content for February first. Most of the Snow Survey Courses show that there is, at this date, about the same amount of water stored in the snow fields as normal exist on the first of April. Should the remainder of the winter season produce the normal quota of snow over the Columbia Basin, FLOOD STAGES will be reached during the runoff season. An early and above normal warm spring would definitely produce a flood hazard in lowlands along the rivers.

Precipitation over the Basin has been normal or slightly above during the month of January at most Stations.

Temperatures have been exceptionally low with 5 to 15 degrees below normal for the month of January.

Reservoir storage is approximately the same as last year (1948), this would indicate an adequate seasonal hold-over if necessary.

STORAGE IN RESERVOIRS OF MONTANA

MISSOURI RIVER BASIN — AS OF JANUARY 31, 1949

RESERVOIR	Location or on diversion from	Usable capacity	Contents this month end	Contents January 1948
Lake Sewall	Missouri	37,800	22,980	23,650
Hauser Lake	Missouri	52,090	29,230	47,180
Ft. Peck Res.	Missouri	19,000,000	12,700,000	12,130,000
Ruby Res.	Ruby	38,500	---	---
Harrison Lake	Willow Cr.	17,760	---	---
Hebgen Res.	Madison River	345,000	246,900	291,500
Madison Res.	Madison River	41,000	33,800	33,460
Smith River Res.	Smith River	10,700	---	---
Gibbons Res.	N. Fk. Sun River	105,000	66,240	60,970
Willow Creek	N. Fk. Sun-Willow Cr.	32,300	18,000	16,410
Pishkun Res.	N. Fk. Sun River.	32,000	16,360	20,840
Lower Two Medicine L.	Two Medicine River	14,000	---	---
Four Horns Res.	Badger Creek	20,000	9,800	7,330
Birch Creek Res.	Birch Creek	30,000	26,370	16,780
Lake Francis Res.	Birch Creek	112,000	98,960	103,107
Ackley Lake	Judith River	5,820	---	4,700
Durand Res.	N. Fk. Musselshell	7,010	3,660	4,300
Dead Man Basin	Musselshell River	52,500	---	---
Martinsdale Res.	So. Fk. Musselshell	23,100	14,050	8,710
Fresno Reservoir	Milk River	127,200	70,290	74,090
Nelson Res.	Milk River	66,800	---	---
Mystic Lake	W. Rosebud Creek	20,800	12,300	15,360
Glacier Lake	Rock Creek	4,200	---	---
Cooney Res.	Red Lodge Creek	27,500	---	7,410
Tongue Res.	Tongue River	73,900	---	8,740
Sherburne Lake Res.	Swiftcurrent Creek	66,100	---	32,760
Lake Helena	Missouri River	10,450	1,460	7,900
COLUMBIA RIVER BASIN				
Georgetown Lake	Flint Creek	31,000	28,360	29,080
E. Fk. Rock Cr. Res.	E. Fk. Rock Creek	16,040	---	---
Nevada Creek Res.	Nevada Creek	12,600	---	---
W. Fk. Bitterroot Res.	E. Fk. Citterroot	31,700	10,000	10,000
Como Lake	Rock Creek	34,800	---	---
Flathead Lake(Sommers)	Flathead River	1,791,000	797,000	971,300
Little Bitterroot	Little Bitterroot	37,100*	36,100*	22,800*
Dry Fork Res.	Dry Fork Creek	6,700*	2,700*	2,700*
Mission Valley Reservoirs	Mission Valley (Flathead River)	105,000**	22,391**	44,100**

*Comprise two Reservoirs on Dry Creek.
*Comprise two Reservoirs on Little Bitterroot River.
**Comprise nine small Reservoirs on Mission Valley Project Indian Reclamation Service.

MONTANA SNOW SURVEYS February 1 , 1949

MISSOURI BASIN

DRAINAGE BASIN AND SNOW COURSE **	State	No.	Elev.	Date of Survey 1949	Snow Depth (In.) 1949	SNOW MEASUREMENTS Water Content (Inches)							Years of Record
							Past Records		Average Data* February 1		April 1		
						1949	1948	1947	Avg.	%Avg.	Avg.	%Avg.	
Gallatin River													
New World	Mont.	4	6600	1-30	36.9	8.2	--	--	--	--	9.6	85	1
21 Mile	"	6	7150	1-31	48.3	14.2	8.8	14.6	9.8	145	15.6	91	14
Mystic Lake	"	3	6600	1-29	31.4	6.6	11.6	4.7	4.9	140	6.6	100	14
Madison River													
Hebgen Lake	"	7	6550	1-31	42.1	11.1	9.5	9.2	7.6	147	11.6	96	14
21 Mile	"	6	7150	1-31	48.3	14.2	8.8	14.6	9.8	145	15.6	91	14
West Yellowstone	"	8	6700	1-31	37.4	9.7	5.1	9.4	7.0	137	10.6	90	14
Jefferson River													
Pipestone	"	14	7200	1-31	28.0	5.2	--	5.0	2.8	185	5.3	98	11
Main Stem Above Great Falls													
Chessman	"	18	6200	2-2	22.4	4.4	6.6	5.0	3.1	142	4.0	111	14
Rimini Lower	"	15	6250	1-31	33.4	6.3	7.2	9.3	4.3	146	5.7	110	14
Rimini Middle	"	16	6800	2-2	40.8	8.7	10.5	10.9	6.3	140	9.5	92	14
Rimini Upper	"	17	8000	2-1	45.0	10.6	13.5	13.5	7.9	135	11.3	97	14
Picnic Grounds	"		6500	1-31	25.0	3.9	3.7	3.1	2.3	170	3.4	115	4
Pipestone Pass	"	14	7200	1-31	28.0	5.2	--	5.0	2.8	185	5.3	98	4
Marias River													
Marias Pass	"	21	5250	2-1	45.3	12.6	8.2	20.2	11.4	110	15.5	82	14

*Average water content for period of record.
**Location data of courses shown on Index Map.

MONTANA SNOW SURVEYS February 1 , 1949

MISSOURI BASIN DRAINAGE BASIN AND SNOW COURSE **	State	No.	Elev.	Date of Survey 1949	Snow Depth (In.) 1949	SNOW MEASUREMENTS Water Content (Inches) Feb. 1 1949	Past Records 1948	Past Records 1947	Average Data* February 1 Avg.	Average Data* February 1 %Avg.	Average Data* April 1 Avg.	Average Data* April 1 %Avg.	Years of Record
Clarks Fork-Above Milltown													
Intergaard	"	6	6450	1-31	33.7	5.6	6.3	5.4	3.7	152	6.3	89	3
Southern Cross	"	5	6500	1-31	22.9	4.3	4.8	3.4	2.5	178	2.9	148	3
Stuart Mill	"	4	6500	1-31	26.9	4.5	5.2	4.4	3.5	128	4.3	104	3
Rainy Lake	"	12	4360	2-3	36.7	10.0	7.0	6.5	7.8	111	--	--	3
Pipestone Pass	"	14	7200	1-31	28.0	5.2	--	5.0	2.8	185	5.3	98	11
Clarks Fork Below Milltown													
Packers Meadow	Idaho		5700	1-27	57.4	19.5	--	--	11.8	165	13.8	104	11
Mud Creek Pasture				1-27	29.3	8.1	--	--	4.9	165	5.1	159	13
YELLOWSTONE Main Stem													
Canyon	Mont.	2	7750	2-1	43.0	10.2	7.8	--	--	--	9.7	105	10
Lake	"	1	7850	2-1	35.3	8.4	--	--	--	--	11.8	82	10
Cooke City	"	10	7400	2-1	29.4	6.1	5.9	5.6	6.1	110	6.9	97	12
Lupine	"	3	7300	2-2	37.9	8.6	5.2	8.0	5.4	161	8.7	108	7
COLUMBIA BASIN Columbia River													
Sinclair Pass	Canada		4500	1-31	17.4	3.2	5.3	--	--	--	4.6	70	12

*Average water content for period of record.
**Location data of courses shown on Index Map.

MONTANA SNOW SURVEYS February 1 , 1949

COLUMBIA BASIN

SNOW MEASUREMENTS

DRAINAGE BASIN AND SNOW COURSE **	State	No.	Elev.	Date of Survey 1949	Snow Depth (In.) 1949	Water Content (Inches)							Years of Record
						Feb. 1 1949	Past Records		Average Data*				
									February 1		April 1		
							1948	1947	Avg.	%Avg.	Avg.	%Avg.	
Kootenai River													
Fernie	Canada		3500	1-31	30.1	6.8	4.9	10.2	5.2	131	6.7	101	8
Gray Creek	"		5100	1-31	43.4	12.1	--	--	--	--	--	--	1
Kimberley	"		3750	1-31	--	--	4.8	6.7	7.2	--	4.1	--	2
Marble Canyon	"		5000	1-30	33.9	7.9	8.7	--	--	--	--	--	1
Nelson	"		3050	1-31	45.4	14.6	9.0	12.9	8.9	164	11.7	125	10
Sinclair Pass	"		4500	1-31	17.4	3.2	5.3	--	--	--	4.6	115	12
Sullivan Mine	"		5100	2-1	38.1	9.0	7.3	11.8	10.8	84	13.5	67	2
Upper Elk River	"		--	1-31	24.4	4.7	5.0	--	--	--	--	--	1
Upper Clark Fork River													
Chessman Res.	Mont.	1	6200	2-2	22.4	4.4	6.6	5.0	3.1	146	4.0	111	14
Intergaard	"	3	6450	1-31	33.1	5.6	6.3	5.4	3.7	152	6.3	89	5
Pipestone Pass	"	5	7200	1-31	28.0	5.2	--	--	2.8	185	5.3	98	11
Rainy Lake	"	6	4300	2-3	36.7	10.0	7.0	6.5	7.8	78	7.2	72	3
Southern Cross	"	9	6500	1-31	22.9	4.3	4.8	3.4	2.5	172	2.9	148	3
Stuart Mill	"	12	6500	1-31	26.9	4.5	5.9	5.2	3.5	128	4.3	104	3
Rimini Lower	"	14	6250	1-31	33.4	6.3	7.2	7.3	4.3	146	5.7	110	14
Rimini Middle	"	15	6800	2-1	40.8	8.7	10.5	10.9	6.2	140	9.5	92	14
Rimini Upper	"	16	8000	2-1	45.0	10.6	13.8	13.5	7.9	135	11.3	94	14
Bitterroot River													
Mud Creek Pas.	"	3	4500	1-27	29.3	8.1	5.2	5.7	4.9	165	5.1	159	4
Packers Meadow	Idaho		5700	1-27	57.4	19.5	11.2	16.1	11.8	165	18.4	104	11

*Average water content for period of record.
**Location data of courses shown on Index Map.

MONTANA SNOW SURVEYS February 1 , 1949

COLUMBIA BASIN

DRAINAGE BASIN AND SNOW COURSE **	State	No.	Elev.	Date of Survey 1949	Snow Depth (In.) 1949	Water Content (Inches)							Years of Record
						Feb. 1 1949	Past Records		Average Data*				
							1948	1947	February 1 Avg.	February 1 %Avg.	April 1 Avg.	April 1 %Avg.	
Flathead River													
Marias Pass	Mont.	10	5250	2-1	45.3	12.6	8.2	20.2	11.4	110	15.5	82	14
Rainy Lake	"	12	4300	2-3	36.1	10.0	7.0	6.5	7.8	78	7.2	72	3
Snow Lab. 13	"	16	5240	2-1	39.3	11.3	6.7	18.8	13.1	86	14.4	79	2
Pendoreille River													
Lookout	Idaho		5250	1-31	87.0	28.2	19.6	28.0	19.6	144	29.4	96	11
Nelson	Canada		3050	1-31	45.4	14.6	9.0	12.9	8.9	164	11.7	125	10

*Average water content for period of record.
**Location data of courses shown on Index Map.